dition of repairing the Temple of Castor in that city, Verres was exceedingly anxious to make a job of this; so he goes to examine the temple, but was much disappointed on finding it in perfect repair, when one of his companions casually observed, there is nothing here to be done, unless you order the columns to be set perpendicular. Verres was evidently surprised at the observation, for he knew nothing of architecture, and to his eye the columns appeared angular; but it was mentioned to him by those who were around him, and no doubt familiar with the practice of the ancients, fere nullam esse columnam quæ ad perpendiculum esse possit. Namely, that in a temple there was scarcely any column, which by the practice of the Greeks, could be perpendicular. Verres was delighted at finding something to set his young friend about, and said, oh by all means let him set the columns perpendicular, and no doubt he took care himself to superintend the payment.

The object of this adjustment is to correct an appearance of fanlike spreading from the base outwards, which takes place in columns which are all perpendicular. It may be owing to this cause that, in consequence of the diminution of the columns, the spaces between them on the architrave are greater than those at the ground (for the eye quite makes allowance for the counterspread of the capitals). Again, owing to the greater depth of shadow behind them, the upper part of the columns will have apparently more strength of light, and consequently appear greater. The effect altogether produced will cause the architrave, if equal, to appear longer than the base, and consequently the angle columns will appear to lean outwards: this is rectified by making the said angle columns lean a little towards the centre of the building. It is a proof of the wonderful judgment with which this quantity was chosen, that so many diligent and accurate observers have studied and drawn these temples without being aware of the fact. When my attention was first called to it, I could not at all perceive it; and I greatly amused a French architect, who had been for some time at Athens, by asking him which way they leaned: after some days the eye began to take cognizance of it, and I could perceive which way it went.

The impression of strength and beauty resulting therefrom is by no means confined to those who are cognizant of the fact; and I doubt not that many of our earlier investigators have been astonished that the level and plumb imitations of Greek architecture which we have in this country so little recalled to their minds the consummate beauties of the Parthenon and other Greek buildings. No doubt our climate is unsuited to the pure Greek, but this is not enough to account for the falling off; it is not so in our Roman and Palladian buildings—witness the portico of the Fitzwilliam Museum at Cambridge, and the Royal Exchange in London, which do not fall so far behind the majesty of the Pantheon. I particularly name recent English buildings, as they are more fairly compared with our Greek revivals than the time-furrowed architecture of St. Martin's and St. Paul's. Now, if we turn to the Greek Doric, the parallel is certainly less satisfactory: and it must be evident that, although, confessedly, native Greek architecture is high above native Roman, our copies of the former are vastly inferior to our imitations of the latter. Of the former we have only preserved the corpse—the vivifying essence is gone; of the latter the energy may be impaired, but it is not destroyed.

One peculiarity which I noticed is that the antæ lean forwards to meet the columns of the pronaos. This seems to have resulted from the inclination inwards of the columns of the peristyle; those of the pronaos and posticum being perpendicular, the effect would have been to produce a strong contrast between their different positions, and the artifice must have been detected: by the influence of the contiguous face of the antæ, the column (here drawn from the posticum), which is really perpendicular, is made to appear to lean slightly in the same direction as the outer columns.

I have observed that a perpendicular pilaster, when brought very near to a column in a portico or doorway, has the effect of making the column appear to lean forward. The inclination of the antæ is not itself visible, except to a spectator in the narrow space between the inner row of columns and the wall; and when the eye is brought very near to a line, so that it cannot take it in all at once, it is scarcely possible to judge of perpendicularity.

The last peculiarities I shall mention are the differences of the abacus. Those on the east front are of the largest class, the north-east and south-east having the largest in the whole temple; they are 6'858: the others in the east front are 6'755; on the south side they are 6'580, and so are they on the west front. The north-west angle is the same as the ordinary size of the east front, 6'755; the south-west angle is somewhat less; on the north side they are 6'750 in the middle, and regularly decrease towards the angles.

I shall be occupying your time too long if I attempt to discuss the reasons which led to this.

The entasis of the columns is the most wonderful and beautiful of all the curves. It is so delicate, that its existence was for some time doubted; and yet I found by careful measurements, in a manner which was suggested to me by Professor Willis, which I will here describe. A fine harp wire was strained from the top to the bottom, as tight as it would bear, close to the edge of such flutes as preserved a sufficient number of points, with the original surface, and by means of a rule similar to the one I here produce, which is supplied with a vernier, I was enabled to measure from the flute to the wire with the greatest accuracy to about half $\frac{1}{1000}$ foot. I took such measures in several columns of the Parthenon, which I found to be wonderfully true and identical. I measured also the entasis of columns from the Erectheum, Propylæa (both orders), Temple of Theseus and Jupiter Olympius. In those of the Parthenon, Erectheum, and Propylæa, I find the correspondence with hyperbolic arcs, which I have calculated so exact, that the mean of from 14 to 20 measurements in each column differs from the calculated curve less than $\frac{1}{1000}$ foot, and none of them, where the surface was to be depended upon, differs by so much as $\frac{1}{500}$. The entasis of Jupiter Olympius gives also a very true hyperbolic arc. The columns of Theseus are so much worn in their outer edges that I was obliged to content myself with measures within the flutes, which never give such regular curves as the fillets, although the flutes are worked with a nicety far exceeding that found in any other style of architecture.

Still, a mean from four different sections within the flutes gives a very accurate hyperbolic arc, although no one is a perfectly regular curve. These hyperbolas are all chosen with their axes, multiples, or aliquot parts of the attic foot. The Greek architects acted with great judgment and knowledge of the nature of the curve they were employing, as it is the only one of the conic sections which can produce variety in such delicate curvature as they have chosen for their entasis.

I must now advert to some of their mouldings, which are worked with the same perfection, and, as far as I have examined, are all different forms of the conic sections.

The echinus of the capitals of all the Doric columns agrees with various forms of the hyperbola. The soffit of pediment, Parthenon, and Propylæa, and I think of Theseus also shews a hyperbolic arc. This is a magnificent moulding, and worked with the utmost perfection. That of the Erectheum is an equally true parabola. The cymatium of the Parthenon is the only certain circular form which I know, except the torus of base, Erectheum, and Ionic order Propylæa. The flutes, also, are all parts of circles, whose centres are proportioned to the width of the flutes. In this they shewed their judgment, as it would have been almost impossible to have worked pure ellipses; and in these retiring surfaces the value of the perfect variety of curvature of the ellipse would scarcely have been appreciated. Talking of flutes, there is a peculiarity in the flutes of the Parthenon, which does not occur in any other of the temples of Athens. The flute at the neck is deeper in proportion to its width than in the rest of the shaft: during the whole rise, until about 3 feet below the neck, the sagitta or depth of the flute, from its chord, is $\frac{1}{12}$ths of chord. At the neck it is $\frac{1}{11}$ths, which is about $\frac{1}{12}$th part greater. This has a good deal of effect on the column, and gives a richness of effect to the upper part, at the same time that it diminishes the light in that part where it can best afford it, viz., where it is contrasted to the deep background of shade of the upper part of the cella wall.

I have not yet much to say with regard to the colouring of the temple, nor have I much time to say that little, for I fear I must have exhausted your patience. The drawings which are at present made represent the architrave, band, &c., the triglph, and the string which carries the marble beams which supported the ceiling. There is not a great deal of positive colour remaining in the Parthenon. The underside of the mutules shew some vestiges of blue and red colour, and the upper part of the nook of the triglyphs, here and there on the east front, preserves some blue. One of the antæ of the Posticum has a tolerable supply among its eggs of blue and green, and some red. The flowers which decorate the cymatium and other mouldings have no trace of positive colour, but the drawing of the ornaments upon them is in many places clearly to be made out.

My companion, Mr. Willson, paid much more attention than I was able to bestow on this subject, as I was almost entirely occupied with the levelling department. He is at present in the country, or I should have been able to produce more illustrations of this part of the subject. I fear, gentlemen, that you will consider that I have been making much ado about a very little or nothing. That it is all about a very little I willingly grant, but that that very little is nothing, there lies the whole question.

F. C. PENROSE.

TESTIMONIAL TO MR. THOMAS CUBITT.

A COMMITTEE of the Builders' Society, comprising Messrs. Elger, Grissell, Grimsdell, Haward, Herbert, Kelk, Lee, Peto, Piper, Rigby, Smith, and Stephens, has been organised for the purpose of presenting to Mr. Thomas Cubitt a testimonial of the respect and esteem of the builders of London, to which he has entitled himself, as they justly urge in their address, by his general integrity of character,—his constant endeavours to promote kindly feelings, as well amongst the builders generally, as between them and their workmen, thus inducing a feeling of mutual dependance and community of interest between the employer and the employed,—the anxiety he has also evinced for the improvement of the moral and social condition of the workman,—and his constant and successful efforts to raise the Building Art to a high standard, by judicious improvements in the construction of buildings, based upon original and costly experiments.

The committee have determined that the object will be best attained by the presentation to Mr. Cubitt of his portrait, painted by a distinguished artist, and that an engraving shall be made from it, of which a copy is to be presented to each subscriber. They appeal to the builders of London to assist in carrying this into effect, and will doubtless meet with that hearty response which the proposal merits. Men like Mr. Cubitt, whose example tends to elevate a whole class, make every member of that class their debtor. The subscriptions already received amount to about 350*l.**

THE CURVE OF POINTED ARCHES.

SIR,—Unless I greatly misapprehend Mr. Laker in his communication upon the "Curves of Gothic Architecture,"† he appears to have made two rather remarkable oversights or mistakes. He says—

1. "Let any one examine our best churches, and he will perceive that the curve has more point at the apex, and more perpendicularity at the base, than the single arc of a circle could produce."

But the constructive diagram proposed by him gives *less* perpendicularity at the base; that is, at a given height—say 1 foot above the springing line—the curve is at a greater dis-

* Mr. Herbert, Cavendish House, Clapham-common, who acts as treasurer, or any member of the committee will receive subscriptions.

† See p. 40, ante.

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